ORION TELECOM NETWORKS INC.

VCL-MX Version 6
DXC 80 E1, 160Mbps
Digital Access Cross Connect Switch

Product Brochure

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Product Overview

The VCL-MX Version 6 DXC - 80 E1, 160Mbps Digital Access Cross Connect is a modular switch which may be scaled from 8 E1 Ports to up to 80 E1 Ports. The VCL-MX Version 6, E1 DACS (E1 DXC) offers full cross-connect functionality to cross-connect between 64Kbps time-slots (DS-0s), "n"x64Kbps consecutive DS-0s and Fractional E1 channels to full E1 channels.

The VCL-MX Version 6 DXC - 80 E1, 160Mbps Digital Access Cross Connect Switch, occupies 6U high (264 mm) rack-space and is a complete 19-inch standalone unit that provides a 64Kbps time-slot (DS-0) cross-connect fabric for up to 80 E1 ports. This product offers 1+1 -48V DC Power Supply Redundancy, 1+1 Control Card and Processor Redundancy, 1+1 Cross-Connect (TSI) Redundancy, 1+1 Timing (Synchronization Clock Circuitry) Redundancy. This DXC offers "user selectable" clock / timing synchronization priority. The Dual Power Inputs allow the equipment to be powered from two separate power sources. AC input external adapter is an optional for AC mains operation.

Key Features and Highlights

- 160Mbps, 80 E1 fully non-blocking cross-connect at 64Kbps (DS-0) level (2480 DS-0 any to any time-slot cross-connect)
- Scalable from 8 E1 Ports to 80 E1 Ports
- 1+1 Control Card Processor Redundancy
- 1+1 Cross-Connect / TSI Redundancy
- 1+1 Timing (Synchronization Clock) Redundancy
- 1+1 -48V DC Power Supply Redundancy (Dual Power Input allows the equipment to be Powered from two separate -48V DC sources
- Bit Error Rate (BER) monitoring BER thresholds to generate BER alarms automatically whenever alarm limits are exceeded
- Telnet remote access. SSH for secured remote access
- SNMP traps
- Maintains Access Security Log
- USB and RS232, Interface for local connection through the serial interface to the "Network Control and Management Software"
- User Selectable Internal, External and Loop-timed clock synchronization priority options
- Local and remote loopback facility.

System Access, Control and Management Options

- Telnet
- SSH
- CLI Control Interface (HyperTerminal or VT100)
- SNMP V2 Traps (MIB File provided)
- GUI (Graphical User Interface).

OAM: Operation and Management Ports

- RS232 Serial Port
- USB COM Port
- 10/100BaseT Ethernet for remote access.

Security and Protection

- Secured Access via SSH V2
- **Password Protection:** Password Protection in compliance with the mandatory clauses of the GR-815-CORE-2 specifications for secured access control
  Logging: Maintains a log of all successful and un-successful attempts. Logged information includes the ID and the IP address of the accessing entities. Alerts the administrator if the un-successful logging attempts exceed 3.
- **Security Audit:** All access logs for up to 30 days are maintained for security audit purposes.
- Security log entry of any request or activity including that user-ID (including IP address, if applicable), to establish user accountability
- Report Generation / Audit Trail
- Security Administration.

System Overview and Architectural Details

VCL-MX Version 6, is a scalable DXC which may be used to cross-connect at DS-0 (64Kbps time-slot level) from 8 E1 Ports to 80 E1 Port (160Mbps). The VCL-MX Version 6 DXC has a multi-slot chassis with TDM backplane. In the chassis, there are ten (10) E1 interface card slots. Each E1 Interface Card has 8 E1 Ports.

Two slots are reserved for 1+1 redundant control cards which includes the redundant cross connect, processor, TSI and clock synchronization / timing functions. One dedicated slot exists for an OAM card and two slots for 1+1 redundant power supply cards.

Chassis / System Backplane

All connections are made at the rear of the chassis, providing interconnections between the various plug-in cards and to the network. VCL-MX Version 6 - 80 E1, 160Mbps Digital Access Cross Connect Switch supports high-density E1 interface cards.

An extensive set of alarms, for easy maintenance are provided in the system.

Timing (Clock) Synchronization

Timing Options	Internal Clock, Loop-Timed Clock, External Clock. User selectable synchronization priority
Synchronization Sources	Internal Clock, span clock timing derived from incoming HDB3 links (Loop-Timed), External Clock, 75 Ohms (TTL), 2.048 Mbits and 120 Ohms (Bits clock)
Default Option	Internal Clock

System Management

VCL-MX Version 6 - 80 E1, 160Mbps Digital Access Cross Connect Switch offers a variety of management options. The equipment may be configured using CLI (English text) commands, or a GUI (Graphical User Interface). The management and configuration commands may be executed from a VT100 terminal, Windows HyperTerminal, any DOS based system, Linux or UNIX based system, or Telnet (remote configuration and management).
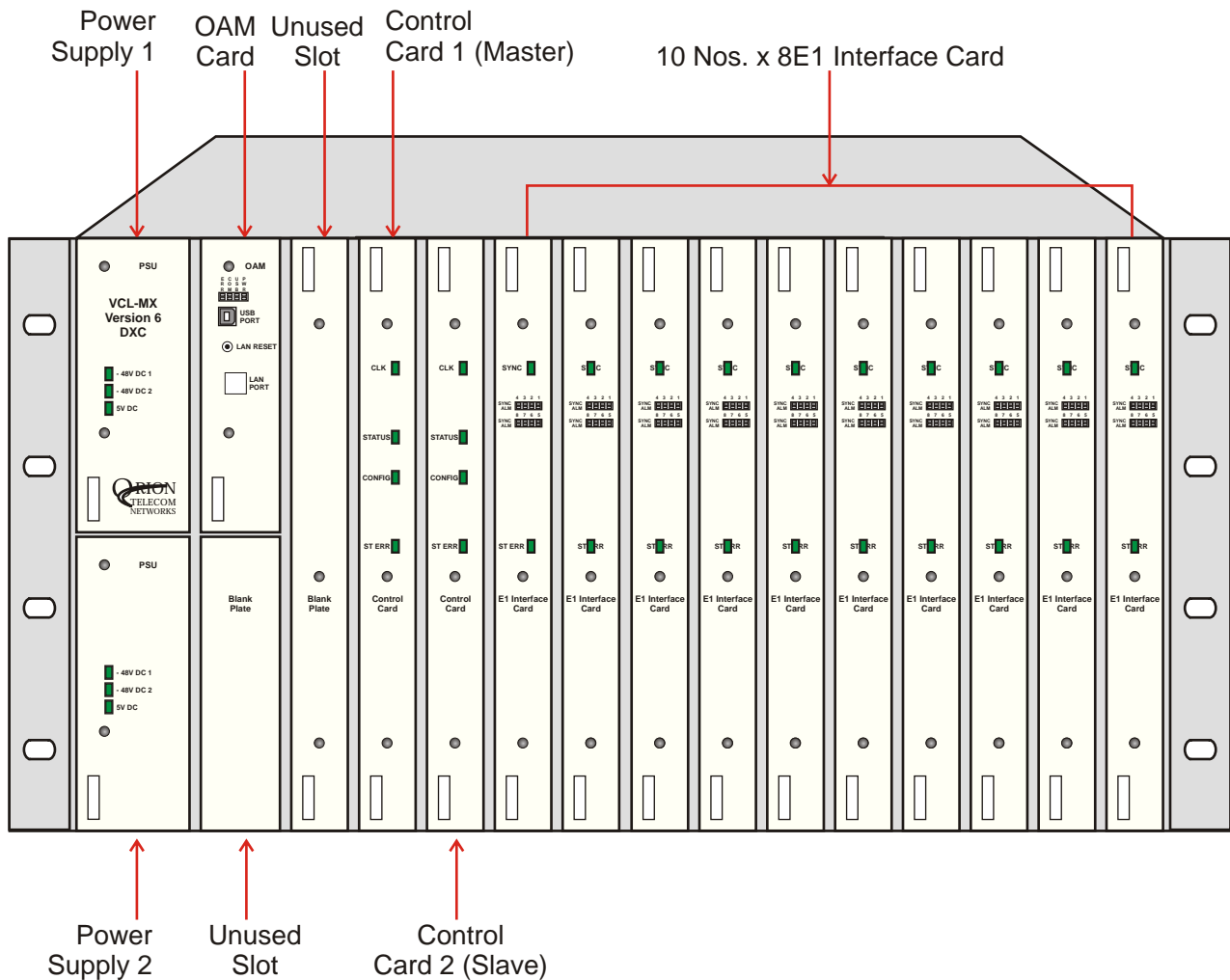
The equipment provides a wide choice of access ports for connecting to and executing management and configuration commands through its OAM Card.

The OAM card provides:

a) COM Port (RS232 Serial Port)

b) USB Port

c) 10/100BaseT Ethernet Port (each multiplexer may be assigned an IP address and connected to a LAN / IP network for remote access and management through the 10/100BaseT Ethernet Port for out-of-band configuration, management and access).

The OAM card supports:

A)   Telnet
B)   SSH
C)   SNMP, V2
D)   Additionally, a Windows based GUI (Graphical User Interface) for easy configuration, management and access.

The VCL-MX has an effective, CLI (text) and GUI based "Network Management Interface", which may be used for configuring and monitoring multiple systems from a single central location.

Status Monitoring

- Synchronization Clock Selection
- Status of alarms
- Enabled / Disabled status of 2.048 Mbps E1 ports
- Monitoring the 80 Port E1 DACS status and configuration
- Monitoring of E1 Link status: LOS, LOF, AIS, ES, SES, UAS.

Alarm Status and Monitoring

- Loss of incoming signal at all 2.048 Mbps E1 Ports
- Configuration error alarm.

LED Indication
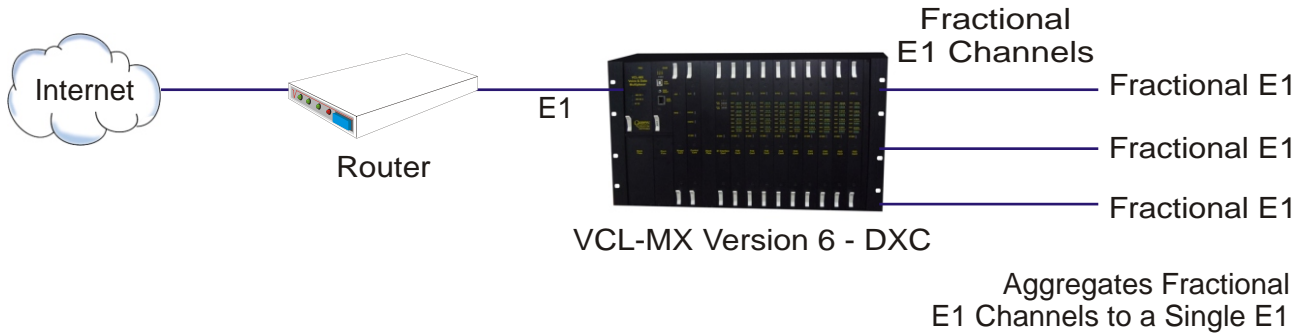
- 1 to 80 E1 Ports LED indicators
- 5V DC present
- -48V DC present
- Configuration error.

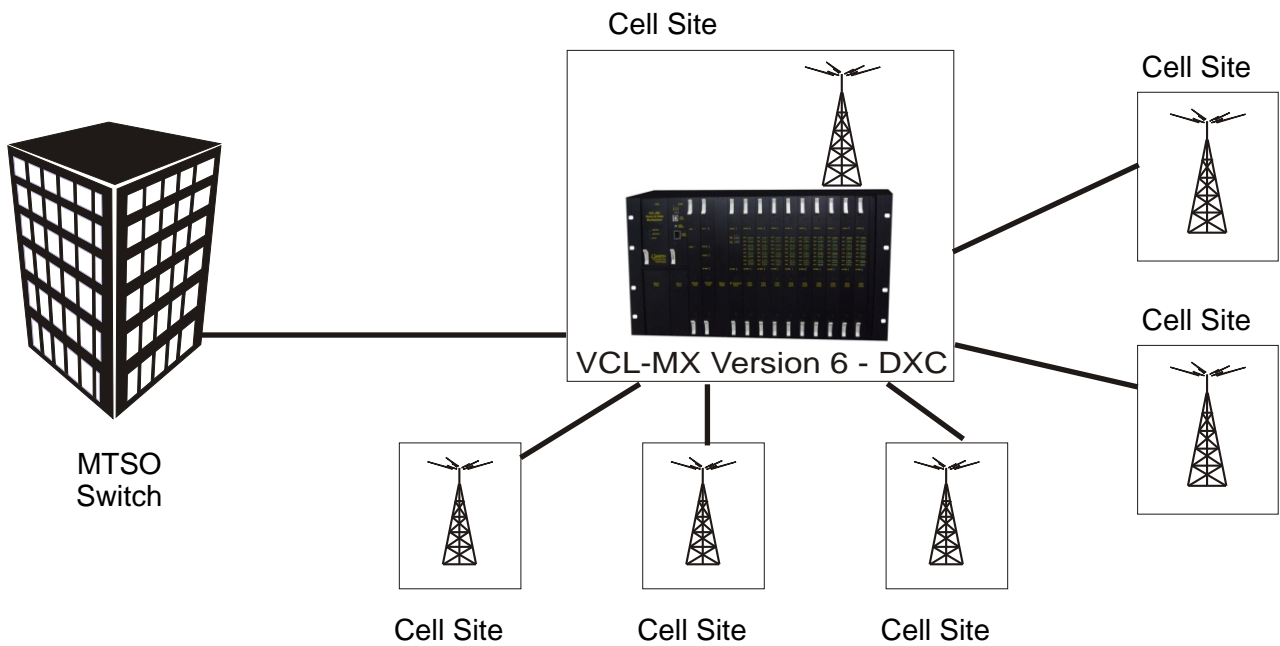## External Alarm - Contact Closures

- 1 Alarm relay Type - Form "C"

Application Diagrams

ISP Digital Cross Connect Application - Providing Fractional E1s to Subscribers

Backhaul - Cellular Application using VCL-MX Version-6 - DXC

Technical Specifications

E1 Interface Card

Maximum number of interfaces	80 E1 Interfaces with full capability to cross connect at DS-0, 64Kbps time-slot level, as well as to inter-connect to voice and digital data services between 80 incoming E1 Ports (i.e. 80 separate E1 Links, 2480 DS-0 any to any time-slot cross-connect)
Number of Interfaces per E1 Interface Card	8 E1 Interfaces with full capability to cross connect at DS-0 64Kbps time-slot level as well as to inter-connect to voice and digital data services between 80 incoming E1 Ports (i.e. 80 separate E1 Links)
Connectors	DB-25 / RJ-45 / RJ-48C
Conformity (electrical)	G.703
Frame Structure	As per ITU (CCITT) G.704
Bit Rate	2048 Kbps ± 50 ppm
Code	HDB3
Nominal Impedance	120 ohms balanced / 75 ohms unbalanced
Peak Voltage of a mark For 120 Ohms Balanced interface 75 Ohms Unbalanced interface	3.0 V ± 0.3 V 2.37 V ± 0.237 V
Peak Voltage of a space For 120 Ohms Balanced interface 75 Unbalanced interface	0 V ± 0.3 V 0 V ± 0.237 V
Nominal Pulse Width	244 ns
Pulse Mask	As per ITU (CCITT) Rec. G.703
Output Jitter	<0.05 UI (in the frequency range of 20Hz to 100 Khz)
Permissible Attenuation	6 dB at 1 Mhz
Return Loss at: 51.2 KHz to 102.4 Khz 102.4 KHz to 2048KHz 2048KHz to 3072 Khz	>12dB > 18dB > 14dB
Jitter Tolerance	As per ITU (CCITT) G.823
Monitoring Connection Line Quality	Loss of Signal (LOS), Loss of Frame (LOF), All Ones Alarms (AIS), Errored Seconds (ES), Severely Errored Seconds (SES), Unavailable Seconds (UAS).
Frame alignment	As per ITU (CCITT) G.732
Loss and recovery of frame alignment	As per clause 3 of ITU (CCITT) G.732
Loss and recovery of multi-frame alignment	As per clause 5.2 of ITU (CCITT) G.732

Control Card - Processor, Timing and TSI Card

Control Card Redundancy	Yes
Processor	1+1 Redundant ARM7 Self Learning Self Healing Automatic Fail-Over and Recovery
Timing and TSI	1+1 Redundant Self Learning Self Healing Automatic Fail-Over and Recovery

OAM - Management Interface Card

- COM Port (RS232 Serial Port)
- USB Port
- 10/100BaseT Ethernet Port - Each multiplexer may be assigned an IP address and connected to a LAN / IP network for remote access and management through the 10/100BaseT Ethernet Port for out-of-band configuration, management and access
- Telnet
- SSH
- SNMP, V2
- Windows based GUI (Graphical User Interface) for easy configuration, management and access.

Power Supply Card

Input DC Voltage	-48V DC (nominal)
Range of Input	-36V to -72V DC
Output Voltage	5V filtered -48V (for terminal cards)
Full Load Current Rating	4A at 48V DC
Input Voltage Reversal Protection	Provided in the Card
Over Current Protection	4A at 48V DC
Short Circuit Protection	Current limit 4A. Recovers on removal of short
Efficiency at Full Load	>91%

Power Consumption

Maximum Power Consumption	90 watts

Environmental

Working temperature	-10^{0}C ~ $+60^{0}$C for operation
Relative humidity	95% R.H. (non-condensing)
Altitude	Upto 9,000 feet

Dimensions

Height	266 mm (19" 6U high)
Depth	270 mm.
Width	482 mm.
Weight	7.0 Kgs.

Regulation Compliance

- Meets CE requirements
- Complies with FCC, Part 68 and Part 15 sub part A specifications.

Others Interfaces

Multi-service platform

VCL-MX Version 6 - E1 160Mbps Multiplexer supports both data and voice traffic.

For voice traffic, it supports the following interfaces:
- FXO
- FXS
- E&M (2Wire / 4Wire)
- Hot-Line (Ring-Down)
- Ring Generator (75V RMS)
- 15-Way Conference
- Magneto (GEN-GEN)
- BRI ISDN (2B+D).

For data traffic, it supports the following interfaces:
- Channelized E1 / Fractional E1 data
- RS232 asynchronous data
- V.24 synchronous data / asynchronous data
- G.703, @ 64 Kbps, co-directional
- V.35, V.36, X.21, V.11, RS530, RS449 synchronous, "n"x64Kbps data
- G.SHDSL "n"x64Kbps data
- 10/100BaseT - Ethernet Bridge (Optical and Electrical).

- Analog I/O Card (Dry Contact)
- Digital I/O Card (TTL signal)
- Universal DCE / DTE synchronous "n"x64Kbps data interface
- 8E1 plus 100Mbps Ethernet fiber optical transport interface along with the following:
    - EOW (Engineering Order Wire) channel for end to end installation and maintenance
    - Local and remote loop back test for diagnostics
    - 1+1 Fiber Path protection
    - ALS (Auto Laser Shutdown) facility for eye safety
    - 10/100M Ethernet Port - 100 Mbps Ethernet data transmission rate complies with IEEE8 02.3
- BRI ISDN (2B+D)
- Complies with FCC, Part 68 and Part 15 sub part A specifications.

Technical specifications are subject to changes without notice.
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